ISO 14,001 in the APEC Context: Uses, Limitations and Policy Alternatives

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I. Introduction and Summary

APEC's eighteen members span East Asia, Australasia and the Western Hemisphere, and include states with different kinds and levels of industrial development as well as the world's fastest growing economies and some of the most polluted places on earth. These economies have agreed to liberalize trade and investment barriers over the next quarter century, to facilitate trade and investment, and to increase economic and technical cooperation.

APEC's Environmental Ministers first met in March 1994, producing a set of "Principles for Sustainable Development."(1) Interestingly, rather than create an environmental committee which could be marginalized from the central trade and investment agenda, in February 1995 the Senior Officials Meeting agreed that all APEC Committees and Working Groups should include environmental issues as part of their reporting requirements.

The July 1996 Ministerial Meeting on Sustainable Development reiterated the "cross-cutting" nature of environmental issues and developed a three-part Action Programme. One of the three major components of the Programme deals with Clean Production/Clean Technology. It will, among other things, formulate specific strategies for industrial and agricultural sectors, mobilize public-private partnerships in major industry sectors to promote cleaner production, include capacity-building, training, information-sharing, access to expert input and the like.(2)

As part of the Cleaner Production strategy, the Environment Ministers pledged to promote "ISO 14000, which involves voluntary action by industry to establish environmental management systems and commit to continuous improvements in environmental performance." In less than three years, the 14,000 series of environmental management standards of the International Organization for Standardization has become the subject of debate and discussion among industry, government and non-governmental groups in many parts of the world.

This paper analyzes the potential role of the ISO 14001 environmental management system (EMS) and related standards in the context of APEC. It summarizes the genesis and content of the standards. It then focuses on three aspects of the standards that are particularly salient within the APEC context: performance, information generation and market access. The final section explores some options for incorporating ISO 14,001 as one element of a larger framework for environmental protection and sustainable development in APEC.

II. The Genesis and Content of the ISO 14,000 series standards

The ISO is a federation of over 100 national standardization bodies, one from each represented country. It was formed in 1946 to harmonize technical requirements and standards in industry with the aim of facilitating international trade -- to make sure screws used uniform thread sizes and the like. Each national body establishes the composition of its delegations, which should include a mix of producer, consumer and other relevant interests. While delegations can (and often do) include government officials, many are dominated by the industry and technical experts most concerned with the financial and other implications of the proposed standardization. International standards are created by technical committees made up of national delegations.(3)Draft texts must be approved by a substantial majority of all ISO member organizations.

A. The origins of the ISO 14,000 series

Until the late 1980s, ISO's work focused on harmonizing existing national technical specifications. Then ISO pioneered a global standard for quality control management, the ISO 9000 standard series. ISO 9000 was the first ISO standard developed more or less from scratch, and also the first to apply across a broad range of industries and processes. ISO 9000 set out procedures and systems to ensure adequate feedback and control systems for quality management, subject to periodic auditing as well as verification by a private outside entity who certifies that the organization conforms to the standard.(4)ISO 9000 quickly became a de facto requirement for doing business in Europe and with large customers elsewhere. From the beginning, some industries voiced concerns that certification requirements were simply disguised trade barriers.(5)

The success of ISO 9000, and of an international management systems approach, led to discussions about applying such an approach in the environmental arena. The 1992 United Nations Conference on Environment and Development, and the subsequent adoption of an action program which envisioned a new role for industry and industry standards in sustainable development, also played a role. In addition, global businesses were concerned about the proliferation of eco-labeling programs in different countries as well as of private corporate codes of conduct.(6) These approaches aimed at using consumer pressure to spur environmental improvements, but they involved inconsistent methodologies and multiple reporting requirements that threatened over time to become a significant burden to business.

Most important, the European Community adopted a Regulation setting up an Eco-Management and Auditing Scheme(7) (EMAS). Under EMAS, industrial sites voluntarily establish systems to analyze and improve the effects of their activities on the environment; they can then register these sites through national registration bodies. Companies based outside Europe began worrying that such a

scheme might provide an unfair advantage to European producers in European markets, and so pushed for a global standard on environmental management and auditing.

The result is the ISO 14,000 series. The series marks the ISO's expansion from a technical specification harmonizing body into a policy field with numerous stakeholders. The drafting committee for the standards contained government and a handful of environmental or consumer advocates, but was dominated by global business representatives and management consultants. Developing countries were underrepresented during the critical period when the basic contours of the standards were established: in a May 1994 meeting in Australia, for example, only five of 26 delegations came from non-OECD states. While Japan, Korea, Canada and the United States have consistently attended meetings, financial constraints have limited other APEC members' participation. Malaysia has only been able to attend plenary, not critical working group meetings, and Indonesia, Thailand and Singapore attended the plenary for the first time in June 1995, when most work on the EMS standard was complete. The EMS standard and guidance document and the auditing standards will probably become final this year, while the others will take another 2-5 years to complete.(8)

B. ISO 14,001: The Environmental Management System standard

ISO 14,001 standard is the centerpiece of the 14,000 series and the only standard for which an organization may seek self- or outside certification. To comply, company management must first define the organization's environmental policy and ensure that it is appropriate to the nature, scale and environmental impacts of the organization's activities. Each organization must commit to continual improvement, to compliance with relevant laws and other requirements, and to prevention of pollution. The environmental policy must be publicly available, and must contain a documented framework for setting and reviewing environmental objectives and targets; assessments of environmental impacts need not be published.

Once plans, objectives and timetables are in place, management must designate responsibility for achieving targets, provide necessary resoures and train appropriate personnel, and prepare an emergency response plan. These activities must be periodically monitored and corrective action taken in cases of noncompliance. Periodic environmental audits, whether internal or external, are required. Such audits may be used by certification bodies to help verify conformance with the EMS. In addition, periodic management reviews are to evaluate the system's continuing effectiveness. The existence of an adequate system may be self-certified or a firm may seek third-party verification to "certify" that it conforms to the standard.

III. Advantages and Limitations of the ISO 14,001 EMS Standard

An environmental management systems-based approach relies heavily on the idea that changes in corporate organization, culture and procedures can yield environmental improvement in ways that a compliance-based approach cannot. In evaluating the usefulness of the EMS embodied in ISO 14,001, three aspects are paramount: whether implementation of the system will lead to improved environmental performance, whether it offers advantages in the production and availability of information, and whether a market-based, market-enforced approach can enhance or limit opportunities for market access. I explore these aspects in turn.

A.performance improvement: not guaranteed

The EMS standard requires no particular level of environmental performance to obtain certification. It "does not establish absolute requirements for environmental performance beyond commitment, in the policy, to compliance with applicable legislation and regulation and to continual

improvement."(9) An annex elaborates:

> the rate and extent of [continual improvement] will be determined by the organization in the light of economic and other circumstances. . . . The establishment and operation of an EMS will not, in itself, necessarily result in an immediate reduction of adverse environmental impact.(10)

This purely procedural approach has some advantages. It allows organizations of all sizes and from all areas to set their own goals and to not be measured by a single metric. Thus, compared to traditional technology-based standards, it does not require imposition of the same technology on firms with different needs and costs, and it avoids some of the economic inefficiency critique of command-and-control rules. It largely avoids the trade barrier issues raised by uniform prescriptive rules and allows maximum flexibility for management.

Moreover, if implemented in good faith, it may create a more "eco-friendly" corporate culture. Rather than restrict discussion of environmental issues to a single environment "shop," it diffuses consideration of these issues throughout the corporate structure, including top management. The standard's drafters hope a systems approach will incorporate environmental concerns into every business decision. And rather than focus on a single point of compliance with a given set of limits and no incentive to move beyond it, it will shift the focus to a wider range of possible parameters and to continual improvement.

However, the danger is that because the goals and priorities are entirely self-chosen, they will only be implemented up to the point where changes no longer result in cost avoidance or short-term savings. Indeed, because there is no prescribed floor or minimum standard beyond a commitment to comply with local law, companies which set extremely lenient goals for themselves, and meet them, will conform to the standard to the same or greater extent than those companies which set themselves more ambitious, and harder to realize, objectives.

1. The environmental policy

The centerpiece of ISO 14,001 is the requirement of an environmental policy. The policy goals and specific timetables and measurements for improvement established in the policy become auditable. The policy must contain a commitment to continual improvement and to setting and reviewing environmental objectives and targets.(4.1) It must also contain a commitment to pollution prevention and to "comply with relevant environmental legislation and regulations and with other requirements to which the organization subscribes."(11)

The commitment to comply with local law at first glance seems almost redundant, as companies presumably are already under a legal obligation to comply. However, given the realities of weak or non-existent enforcement of environmental laws in much of the world, especially in developing countries, an alternative method of coaxing or inducing companies to come up to compliance, even if they don't move beyond it, would be welcome. The third parties certifying compliance with ISO 14,001 could become, indirectly, additional resources to monitor legal and regulatory compliance and allow regulators to focus on the worst violators. Unfortunately, ISO 14,001's utility in this regard is limited by the availability of self-certification and the weaknesses in the certification system, which are discussed below.

The commitment to compliance goes beyond local law to encompass codes of conduct and other "requirements to which the organization subscribes." These might include industry codes, internal company standards, agreements with public authorities or those arising from partnerships with government or non-profit groups. This provision could provide a way to verify the commitments an

organization has taken on through signing the Business Charter for Sustainable Development or other similar initiatives, most of which rely only on self-reporting to monitor compliance with their provisions. It could also provide a way of checking on adherence to internal standards set by many global corporations. Because these other commitments do often include more substantive requirements in the areas of emissions and waste reduction, public access to data and the like, it should be possible to use ISO 14,001 to verify these more far-reaching commitments for those companies that choose to assume them. Thus, one way to strengthen the ISO 14,001 standard would be to encourage its use in combination with adherence to other "green industry" codes and similar programs.

However, the commitment to compliance is also limited. It is unclear whether a commitment to comply is the same as actual compliance, but over time presumably there must be at least some improvement to evidence any commitment at all. More important, there is no additional requirement that, for example, an organization with operations in several countries apply the same rules, or the most stringent rules, to all its operations worldwide. The ISO definition of "organization" allows each operating unit of a corporation to be considered as a separate organization.(3.13) This may be useful in ensuring that each operating unit must independently qualify for certification, but it also means there is no way to hold transnational firms operating in several countries to a higher standard than local law allows in each one, nor for better-performing units within a large organization to pull the laggards up.(12)

The requirement of continual improvement is potentially one of the most innovative, moving organizations beyond a focus on a compliance-based "bright line." However, its forumulation in ISO 14,001 is extremely problematic. Continual improvement is defined as the

> process of enhancing the environmental management system (my emphasis) to achieve improvements in overall environmental performance, in line with the organization's environmental policy. Note: The process need not take place in all areas of activity simultaneously.(3.1)

Thus, while the ultimate goal may be real improvement, all that is arguably required is better systems over time.(13) In a related issue, the audit required under ISO 14,001 is a management systems audit designed to evaluate if the proper procedures have been put in place and maintained.(4.5.4) It is not necessarily primarily about auditing actual performance, although it will check whether information to track performance has been recorded.(4.5.1) (14)Indeed, the definition of EMS audit specifies that audit criteria may be set by the organization itself.(3.7)

Moreover, an attempt by several delegations to tie continual improvement to the goal of reducing impacts to levels not exceeding those corresponding to economical viable application of best available technology was rebuffed. The standard reads: "the EMS should encourage organizations to consider (emphasis mine) implementation of best available technology where appropriate and where economically viable."

In contrast, the European Management and Audit Scheme is much more focused on performance outcomes, requiring continual improvement of a participating site's actual performance in 11 specified areas set out in an annex. EMAS Article 3(a) requires "reasonably continuous improvement of environmental performance, with a view to reducing environmental impacts to levels not exceeding those correponding to economically viable application of best available technology." The audit must evaluate performance as well as management systems. (Art. 4)

Another major aspect of the policy is a commitment to prevention of pollution. This language,

inserted by the U.S. delegation, is positive in that it goes beyond compliance with existing laws and is in line with the thrust of much current thinking on environmental protection. However, the definition is so watered down as to be meaningless it includes processes to control pollution, which may include recycling, treatment, and others. (15) According to U.S. EPA and many other experts, (16) neither simple pollution control nor after-the-fact treatment or off-site recycling are really prevention, which focuses on changes in process, practices and materials to avoid introducing pollutants into the environment at all.

Of course, it is possible to use ISO 14,001 to create a performance-oriented, best-practice based system -- it is just not required. Thus, to strengthen the standard's usefulness, those interested in performance should differentiate among ISO 14,001-compliant firms based on the quality and content of their stated policy. But the price of such differentiation will be losing the uniformity of requirements that made a global standard attractive in the first place.

2. Environmental registers and the uses of information

Creation and maintenance of an EMS potentially involves the generation of a great deal of useful information. Firms must investigate the environmental effects of their resource use, production and disposal policies, must monitor their efforts at control or prevention, and must track the results of their efforts. All this produces information useful not only for internal management and improvement. The same data is of interest to governments for uses ranging from cross-sector and cross-country comparisons, to devising national accounting systems that incorporate resource and pollution indices, to policy convergence and transboundary cooperation, to planning how to meet international legal obligations to reduce greenhouse gases and the like. It is also of interest to other firms in the same industrial sector as a means of comparison and benchmarking; and to local governments and communities interested in accident avoidance and local planning. Finally, public information shores up the credibility of a voluntary scheme by allowing the public, and environmental groups, an independent check on the improved performance of an ISO 14,001-certified entity, and by creating reputational incentives for firms to improve. Thus, one of the major potential advantages of ISO 14,001 is its ability to generate much-needed information.

Under ISO 14,001 an organization must put in place a "procedure to identify the environmental aspects of its activities, products and services that it can control and over which it can be expected to have an influence, in order to determine those which have or can have significant impacts on the environment."(4.2.1) However, the procedure is weak because the kind of data, and the kind of environmental impacts that must be inventoried, are left completely to the discretion of each organization, and the organization need only "consider" these impacts in setting objectives and targets. (17)

More important, ISO 14,001 does not require publication of an environmental register, or publication of audit results. Only the environmental policy need be public. Elsewhere, the standard merely requires that organizations "consider the views of interested parties" in formulating objectives, and "consider processes for external communication on its significant environmental aspects and record its decision." Attempts to include mandatory publication of information foundered on U.S.-led fears that such data could be used in litigation or by regulators, and would create pressure for cosmetic, rather than real, audits. (18) While such concerns may be valid, they may be dealt with through case-specific confidentiality or audit protection rules while still requiring enough disclosure to safeguard the integrity of a market-driven process.

EMAS, for example, requires evaluation of a specified group of parameters, including resource use, waste disposal, impacts to air, water, land and natural resources, accidents, and the potential effects of new products and new or changed processes, and the production of an environmental register on the basis of this evaluation. It requires a public environmental statement, which must include a

summary of figures on pollutant emissions, waste generation, use of raw materials, energy and water, an assessment of significant issues, a description of policy, program and systems at the site, and the name of the accredited verifier.(EMAS 3(f), 5, Annex V). The public statement is seen as essential to ensure improved environmental performance.

IV. Implementation and Market Access Issues

The ISO 14,001 EMS standard is designed to be voluntarily adopted by organizations. Companies may choose to implement an EMS for a number of reasons, both internal and externally-imposed. Those companies that adopt the standard for internally-generated reasons are most likely to take it seriously and to stress performance, while those "conscripts" who feel pressured or forced into too-quick adoption may see it more as yet another paper-shuffling enterprise.

A. Reasons for implementing an EMS

1. Internal reasons

A first group of reasons for implementation concerns the companies' own needs. Implementation of an EMS may allow firms to improve their compliance with existing national laws, reducing exposure to enforcement actions, lawsuits or community distrust. Backers of systems approaches point to the savings and increased efficiency that can be generated through waste minimization or input substitutions identified through the EMS process. Moreover, an EMS may allow companies in highly sensitive or consumer-focused industries to cultivate a "green" image, increasing their market share or distracting attention from past failures. In all these concerns, it is the implementation of the EMS itself, not necessarily its certification, that is paramount.

2. Implementation through regulation

In some places industry self-regulation may be touted as an alternative to "command-and-control," and users may hope for decreased regulatory scrutiny if they show compliance with an EMS. This decreased scrutiny may take many forms: fewer inspections, quicker permitting, or waiver of certain requirements. Creation of an EMS may also be imposed after a violation has taken place, as part of remediation for environmental violations or of a cleanup plan. (19)

To date, no regulatory agency has relaxed its scrutiny simply based on compliance with ISO 14,000. Several APEC economies have incorporated use of an EMS into voluntary programs that trade increased documented and supervised self-regulation for relaxed permitting and monitoring requirements. For example Victoria, Australia, allows use of an EMS as one element of an integrated license, and California and other U.S. states are considering its use as one element in a consolidated multimedia permit. (20) South Korea's Ministry of Environment is implementing a program for Environmentally Friendly Companies which requires an environmental management system, an environmental assessment and improvement plan and a demonstration of actual improvement; the Ministry inspects prior to designating the site as "Friendly" and exempting it from surprise compliance inspections. (21) In the United States, the Environmental Leadership Program and Project XL operate along broadly similar lines. (22)

3. Enforcement through the market: the use of supply chains

A final impetus for adoption of an EMS is market pressure on the supply chain. If large global businesses begin preferring certified entities or requiring proof of certification to ISO 14,001 or another EMS standard of their suppliers, demand for certification will grow. Especially as global business structures more and more resemble dense networks of large and small suppliers and contractors, the leverage exercised by large transnational businesses over other firms in their supply chain is potentially quite powerful. (23)

Similarly, if government procurement practices begin to incorporate certification preferences or requirements, companies seeking contracts will be likely to seek out certification. This was indeed the result after the introduction of the ISO 9000 quality control standard, and a similar snowballing effect may occur here. The result, at least in theory, will be pressure emanating down the supply chain to encompass a wide range and size of producers. In some markets, pressure from banks and insurance companies anxious to minimize their own potential environmental liabilities, or from investors looking for a quick investment "green screen" or to comply with regulatory disclosure rules may also create pressure for certification. (24)

It is as yet unclear whether, and under what circumstances, large global industries will see a business advantage in either complying with ISO 14,001 themselves or in encouraging such compliance in their suppliers. Unlike ISO 9000, no immediate impact on product quality or useability is associated with better environmental management. Certification requirements may be limited to high-profile companies or sectors, where a major accident or discharge would reflect badly on the entire sector. On the other hand, fear of legal liability in more litigious cultures, or of public opprobium and damage to reputation being passed up the supply chain, may extend a desire for added assurance to suppliers even those in places where liability is of far less concern. If suppliers are less likely to be subject to government shutdowns or fines, the indirect benefits in timeliness and reliability of output may help convince other large purchasers to require EMSs. Large developed-country based global enterprises, driven by their own liability or reputational concerns, may thus serve as transmission belts not only for the existence of a certified EMS, but for real performance improvement among their suppliers. If so, such enterprises may also be instrumental in providing the training and capacity-building to enable suppliers to meet their requirements.

B. Market access problems and issues

Of these various motivations, the promise of regulatory relief largely drives interest in ISO 14001 in the United States. However, in most other APEC economies the highest concern appears to be the possible trade implications of the standard. If governments and private customers in one or more major export markets begin preferring ISO-certified suppliers, many developing country producers worry that they will be left out or, at the least, will find certification more difficult than will developed-country industry. This has led, on the one hand, to a good deal of resentment against what many exporters see as yet another nontariff barrier aimed at developing country economies, and on the other to widespread interest in assuring the ability of local industry to meet the standard.

Some developing country industry sees an EMS requirement, whether imposed by purchasers or governments, as a trade barrier simply because it imposes requirements unrelated to inherent product characteristics like quality or price. However, as an international standard, ISO 14,001 presumptively meets the requirements of international trade law in this regard. (25) A second argument is that developed country industry will find it easier to put a certifiable EMS in place, because many companies already have EMS' and because they have greater technical and financial capability. To the extent this argument rests on underlying more stringent regulatory and legal conditions that make it more likely for developed country firms to create EMSs for their own purposes, the developed country advantage is simply an aspect of comparative advantage.

However, a preference or requirement for ISO 14,001-certified firms may exacerbate disparities between large and small firms, disadvantaging small and medium enterprises (SMEs). An attempt to tailor a standard to SMEs during drafting failed, although several specific guidance documents are now in process. Nonetheless, the proportional costs for SMEs will be greater than for large firms, especially if outside certification is required. At its worst, such disproportionality could become a barrier to new entrants into some sectors. To redress this problem, either large purchasers and/or governments might consider targeting capacity building, financial aid and training specifically at

SMEs. Similarly, those firms with an ISO 9000 quality management program in place will find it easier to gain certification to ISO 14,001, and many consultants are urging joint certifications to both systems. This may also induce market access distortions.

C. Problems related to certification and accreditation

A potentially potent source of trade barriers are the issues surrounding accreditation of certifiers and requirements for certification. Under ISO 14,001 an organization may choose to make a self-declaration of conformance without any outside review. EMAS, in contrast, requires independent verification of compliance, and validation of the completeness and accuracy of the environmental statement, by a person or institution accredited for that purpose. Because of the inherent credibility limits to self-declaration and the incentives to cheat, both markets and regulators will probably be reluctant to accept such self-declarations, at least outside the SME context, and will require some outside verification of conformance with the standard.

Under EMAS, certifiers may be private individuals or firms located in any EU member state, but they must be accredited by the national accreditation body of the state where the site is located. Firms that wish to register to EMAS, in turn, must seek registration through each member state's competent registration body, usually located in the Ministry of Environment.

Under ISO 14,001, private or public-sector certifiers may be accredited by any national accreditation body. However, to date, no international standard regulates the composition or activities of ISO 14,000 accreditation bodies, although several drafting exercises are in progress. (26) At this point, therefore, the accreditation of certifiers in one country does not guarantee that they will be acceptable in others. Indeed, one of businesses' objections to the ISO 9000 scheme has been that industry and governments in some states or groups of states have only accepted certifications from locally-accredited individuals or firms, thus undermining the global nature of the standard and adding significantly to the costs of implementation. (27) Some mutual recognition agreements exist, but have not yet been extended to the environmental management arena.

While lack of mutual recognition raises market access concerns, automatic recognition would raise an opposite concern: many accreditation bodies in APEC economies are closely tied to ministries of commerce and trade. In an effort to boost exports, they will be tempted to enforce less than rigorous procedures and oversight on certifiers. Therefore, mutual recognition of accreditation must go hand in hand with strict, mutually verified and maintained guidelines.

Of more concern than the independence of accreditation bodies is both the independence and capacity of the third-party certifiers themselves. The credibility of ISO 14,001, especially in the absence of any disclosure requirements, hinges on the credibility of the certification. If certifiers are seen as merely ratifying a tepid exercise in paper-pushing, the scheme will quickly lose value both in the market and to regulators.

There are a number of reasons for concern that certification will be a less rigorous process than hoped for. First, many certifiers, especially in Asia, are closely connected to government export-promotion functions. For example, in Chinese Taipei, the Bureau of Commodity Inspection and Quarantine has issued about half the current ISO 9000 certifications at no cost to Taiwan companies, and is expected to provide the same services for ISO 14,000 at low or no cost. The Bureau is under the Ministry of Economic Affairs. In Singapore, the Institute of Standards and Industrial Research, which carries out ISO 9000 certifications and is expected to do the same for ISO 14,000, is under the Ministry of Trade and Industry, as are two of the three accredited Indonesian ISO 9000 certifiers. (28) In Malaysia, the government underwrites the cost of training seminars on ISO 14,001. (29)

If the primary purpose of certification is to expand export opportunities, the pressure on certifiers to not "fail" any national industry will be formidable. Certifiers who develop a reputation for requiring tougher showings or who are less compliant than others are unlikely to be asked twice to certify companies. Under these circumstances, the end result may be a "race to the bottom" in which the least demanding certifiers garner the most business, and those states that encourage less-tha--thorough certification obtain the greatest number of certified companies with the accompanying export advantage. All this without considering the ever-present problems of capture and corruption inherent in any oversight function.

If large global purchasers and others demand only a paper certification, without any evidence of real performance improvement, the whole system may have limited environmental utility and devolve in merely an additional cost to business with only transient market value. If on the contrary, real improvement is required, there may be at least initial suspicion of national certifiers and a turn to well-known international firms. This will increase cost and worsen market access for developing countries but also provide a limit to the downward spiral described above.

The probable dominance of certifiers from the quality control area who have expanded into ISO 14,000 EMS certifications raises another set of problems. Quality control certifiers are trained to focus on systems and management functions; the predominance of ISO 9000-trained certifiers will reinforce the systems aspects of ISO 14,001, with much less attention paid to the technical and performance-based aspects of performance improvement. Such certifiers may have little or no training in environmental science or in the chemical or biological sciences necessary to understand the relevant questions, pollution-generating processes or possible solutions. A better idea might be the development of more specialized certifiers with the required expertise in one or a few industrial sectors, who then certify industries in a wider geographical ambit than their own country to minimize worries about integrity.

V. ISO in APEC: Playing to Strengths, Shoring Up Weaknesses

Many APEC economies are preparing to make use of the standards: government agencies are gearing up to accredit certifiers, aid in dissemination, and in obtaining certification; businesses are attending training sessions and some, mostly large multinational firms, have already sought certification. Few economies in the region have said they will make compliance mandatory, and most have been quite cautious about proposals to use certification to replace or lessen other legal obligations.

A. ISO 14,001-Related Efforts to Date in APEC Economies

In the United States, U.S. EPA is discussing with other federal agencies the potential use of ISO 14001 in conjunction with their own procurement standards. Japan has said it will eventually require all industries to implement ISO 14,000, and the Ministry of International Trade (MITI) is aiding industry on a sector-by-sector basis to develop protocols that will lead to certification. In Cinese Taipei, a high-level government Working Group has been formed to oversee a "Scheme for Promoting Environmental Management Standards." The Bureau of Commodity Inspection and Quarantine, which has issued ISO 9000 certifications at no cost to Taiwanese industry, will be in charge of accreditation and certification systems. The Industrial Development Bureau will assist industry diretly, while the Environmental Protection Administration will deal with eco-labeling and the Bureau of Foreign Trade will track ISO 14,000 requirements. The government-funded Industrial Technology and Research Institute is conducting a pilot EMS program with five diverse plants, and the results will be used to assist other companies.

In Singapore, the government's Productivity and Standards Board has been certifying companies since July, making Singapore one of the first countries to introduce the scheme. In Malaysia, the Standards and Industrial Research Institute (SIRIM) has announced adoption of the draft standards

and is offering training programs to industry; it plans to offer certification to both Malaysian and Indonesian industry. The Philippines this year formed a multi-sectoral committee on environmental standards; the Bureau of Product Standards will be in charge of certification. The PRC has adopted ISO 14,001 as a national standard, and is conducting trainings and workshops on its use. Thailand has also adopted the standard and is encouraging certification. The Hong Kong Productivity Council has led pilot projects, one aimed specifically at SMEs, and Korean industry has also been participating in pilot projects. Other APEC economies have similar programs in the works.

Within APEC itself, the Environment Ministers' meeting in July 1996 placed primary responsibility to develop the Cleaner Production strategy on the Industrial Science and Technology Working Group, together with the Human Resources Development Working Group, the Energy Working Group, and others, as appropriate. The Human Resources Development Working Group is focusing on developing a Sustainable Development Training and Information Network which will provide training, information sharing and technical capacity-building on best practices in different industrial sectors. (30)The Industrial Science and Technology Working Group has to date focused on information and technology-sharing; its agenda vis-a-vis ISO 14,000 is under discussion. (31)

B. Mandatory or voluntary?

With the exception of Japan, no APEC economy has to date said it will require compliance with ISO 14,001. Indeed, the Australian federal government recently decided not to require compliance even of companies tendering for government contracts, in an effort to protect SMEs. (32) Nonetheless, concern exists that ISO 14,001 may over time become mandatory, either as a result of domestic legislation or as a market requirement in "big-market" countries or regions.

As a domestic regulatory strategy, mandatory compliance may backfire. The tendency for most firms would be to go through the motions only, doing the minimum possible to comply with an external mandate. Moreover, requiring compliance would require additional enforcement resources, erasing one of the main potential advantages of an EMS from a regulator's viewpoint. And given the limits of ISO 14,001 to compel performance improvement, the environmental advantage might be minimal, especially if expenditures on ISO 14,001 replace or defer other more substantive efforts. In addition, if imports were subject to similar mandatory certification requirements serious market access issues would detract attention from the environmental improvement goals.

Rather, government action can be based on capacity-building, encouragement and incentives or preferences, at least until the standard has had a chance to prove itself in practice. Such action could be based on a number of principles:

1. The overall goal is sustainable, environmentally sound industrial production. ISO 14,001 compliance and certification is only one route, and may not be the most effective route, towards that goal. An EMS is only the "casing": the real issue is whether what is inside the casing is real or is just a paper effort. ISO 14,001 should be considered, promoted and discussed only as part of the larger question of routes to continual improvement of environmental performance. Complementary efforts should focus on performance indicators and audits, disclosure of information on environmental impacts and improvements, and local community and worker participation in evaluating performance.

2. Voluntary approaches like ISO 14,001 work best in the context of a clear, consistent and well-developed regulatory structure which tells companies what laws and regulations they must comply with, and which provides cost incentives for choosing clean production and clean technology rather than face enforcement fines or skyrocketing waste disposal costs. A focus on voluntary incentive programs cannot take away resources from capacity building, coordination and implementation of strong regulatory frameworks within each APEC economy, or from efforts at convergence of such

regulatory frameworks at a high level of protection.

3. Ecologically sustainable industrial production requires a sector-specific approach to environmental management. One of the limits of the ISO 14,001 standard is precisely its "one-siz--fits-all" approach. The development of the more meaningful, performance-oriented possibilities of environmental management systems should be done on a sector-specific basis. Japan is pioneering this approach, encouraging sector-specific industry groups to prepare firms in their sector to adopt the standards.

4. The process is dynamic. Initially, many firms will likely see ISO 14,001 as a mere "stamp of approval" needed to enter export markets. But over time, going through the procedures may lead to a greater organizational commitment to them. And the notion that suppliers may require some environment-related conditions may, over time, evolve into acceptance of a requirement for more substantive conditions.

5. ISO 14,001 should be viewed with great caution as a regulatory tool. Regulators should not grant exemptions, releases from legal requirements or positive recognition to firms based solely on compliance with, or certification to, the standard. Rather, as detailed above, such exchanges should be based on a much broader package of voluntary efforts.

C. Shoring Up Weaknesses: A role for APEC

Current proposals in APEC include training and information exchange for industry and for government officials on ISO 14,001. (33) In addition, APEC can take steps to improve use of the standard by focusing on three main areas of concern: performance, information generation and provision, and market access. APEC can play a role in all three areas, by making available information and training, engaging in capacity-building, fostering regional cooperation and joint work, and exploring alternatives and adjuncts.

1. Focus on Performance, Not Just Systems

APEC can promote a role for more performance-based voluntary systems, including EMAS, various business-generated codes of conduct like the CERES Principles, and national efforts along these lines. It can also spur training, information exchange and the like for regulators from government environment ministries concerned with devising appropriate regulatory "packages" using environmental management systems.

With respect to EMAS, for firms that might wish to export to European markets, a joint ISO 14,001/EMAS certification program would allow cost savings and also produce a more performance-oriented EMS. Such a joint certification will find easier acceptance in Europe. Companies will probably be able to use ISO 14,001 to comply with part, but not all, of the requirements for EMAS. (34) A "bridging document"(35) setting out the differences, and the additional requirements of EMAS, will shortly be available.

One of the most interesting uses of reputational incentives to encourage superior environmental performance comes from an Indonesian initiative. The National Pollution Control Agency (BAPEDAL) in June 1995 launched the Program for Pollution Control, Evaluation and Rating (PROPER). PROPER stems from the reality of weak enforcement ability and stretched regulatory resources in Indonesia, and attempts to use public disclosure and reputational incentives to induce better industry performance in combination with a traditional regulatory system. (36)

The program compiles water pollution data for 187 large industrial sources from existing regulatory programs combined with self-monitoring reports from polluters as well as inspections; it will expand toward coverage of air, water and hazardous waste from all medium/large industrial sources. It then

uses the data to rate each source based on five color performance categories. (37) This avoids the traditional binary division into "compliance" and "non-compliance," rewards continued improvement starting from whatever point a company is now at on this spectrum, and provides information to regulators from companies seeking a superior rating. Like ISO 14,001 it relies on a judgment that companies (and the individuals who run them) care about their reputation for environmental responsibility and can be "shamed" into improving, but the focus is on performance, not systems. (38) Indonesian regulators are currently exploring how ISO 14,001 compliance could be used as part of their determination that a company deserves a green rating. (39)

Another spur for performance improvement would be to encourage involvement of local government and/or community representatives in environmental audits or reviews. For example, Japan uses business - local government partnerships to work toward focused pollution reduction programs. Other examples include the chemical industry's Responsible Care self-regulatory program, which provides for local community liason panels and a National Community Advisory Panel. (40) In the U.S., several companies have entered into "good neighbor agreements" wherein they agree to local community participation in, and review of, environmental audits. (41)

A third area worth exploring is the creation or adoption of sector-specific EMS's that move towards a focus on performance indicators while allowing flexibility in reaching performance goals. These could be done on a regional basis, and could adopt existing performance-based ratings systems(42) or seek new ones. Applications in resource-intensive and service sectors would be particularly welcome. As mentioned above, this development would go hand-in-hand with training and accreditation of sector-specific certifiers. Here the IS &T working group could work in conjunction with working groups on transportation, tourism, energy and others.

Additionally, banks and insurance companies are a potentially potent source of environmental performance improvement. One expansion of a systems approach would be to combine it with specific performance indicators in requirements for project financing. Guidelines for banks and insurers when looking at different sorts of projects would be most welcome.

2. Expanding information provision

A number of countries have reporting and auditing requirements for information on environmental impacts and processes. Denmark requires its most heavily polluting countries to set up public annual accounts of environmental aspects of performance. (43) The Malaysian Department of Environment, under the revised Environmental Quality Act, may mandate environmental auditing for seriously polluting facilities. The Thai government requires major factories to regularly report and monitor emissions and effluents. The Australian government is planning to require annual pollutant reports from at least the largest national facilities. The United States' Toxics Release Inventory has recently incorporated requirements to report on the quantity of chemicals generated as well as released; several U.S. state requirements go further, requiring reporting on inputs, consumption in-process and in-product as well as emissions and transfers. (44) These mandatory reporting rules may facilitate introduction of ISO 14,001, as companies will have to set up systems to obtain the necessary data anyway. APEC can encourage training, information and technology-sharing, and the like.

Information provision is an important component of benchmarking efforts. In the benchmarking area, one problem is that the information now provided by companies, or gathered for their internal purposes, is usually not comparable: definitions, reporting frequencies and units of measure vary, pollutant outputs are often not expressed in terms of amount of production, and the like. Several efforts are underway through ISO's subcommittee on environmental performance evaluation, (45) OECD, the United Nations and North American regional trade bodies to develop more uniform registers which will permit cross-firm and cross-country comparisons. (46) The World Bank is also

engaged in potential benchmarking efforts through the construction of its Industrial Pollution Projection System. (47)

APEC could play a role harmonizing region-wide environmental performance indicators. Especially necessary are performance indicators that measure progress towards cleaner production rather than simply emissions-based compliance indicators. The various working groups on tourism, transportation and the like could contribute to APEC's work in that regard.

3. Improving market access based on high credibility

One area in need of coordination is the accreditation of certifiers for ISO 14,001. Creating an accreditation body that will have high standards and win global acceptability for its certifiers is expensive: some of those costs could be reduced through a region-wide accreditation body or development of joint rules and mutual recognition among a few sub-regional bodies (i.e. Pacific Accreditation Council, Latin American). A uniform set of rules, at a minimum, that provided adequate assurances of the integrity and thoroughness of certifiers to ISO 14001, would minimize the problems involved in the multiplicity of different accreditation bodies. Rules might also allow for certifiers from different areas to cross-check each others' work as another way of increasing credibility. A model might be the European Accreditation of Certification, which recently agreed to mutual recognition of members' accreditations and the development of common guidelines. (48) The APEC Committee on Trade and Investment's work program point on Standards and Conformance would be a natural liason for this work.

In addition, one consequence of ISO 14,001 used as a requirement of contract is that it may well widen the competitive gap between affiliates of global corporations and a handful of large domestic enterprises, on the one hand, and domestic small and medium enterprises (SMEs) on the other. SMEs will more likely have no existing environmental management system, need better equipment, and face higher training costs, with less ability to pay for them. Market access could improve through region-wide initiatives to facilitate adoption of an environmental management system by SMEs. This would involve training, financial assistance and the like, and should be done in conjunction with the Committee on Trade and Investment's group on SMEs and with the Sustainable Development Training Network. Similarly, large global corporations should be encouraged to use their links with SME suppliers as well as purchasers to provide training and technical assistance in implementing an EMS, perhaps through the concept of product stewardship.

Finally, APEC seems ideally suited to track and monitor the trade impacts of ISO 14,001 on exporters from the region. ISO 14,001 may well become a sine qua non for doing business in some sectors and some markets, but not in others. To make better decisions, both governments and the private sector need up-to-date information on where certification is required, where other certifications like EMAS, BS 7750 or others are required, where specific environmental commitments are required as a condition of contract, and the like.

Conclusion

Reaching the overall goal of sustainable industrial development will require a combination of government regulation, industry self-regulation like ISO 14,001 and public pressure. Different combinations of methods will apply in the different APEC economies. In particular, a different set of incentives and support will be needed where a developed regulatory system is facing pressure for deregulation and streamlining, than where an incipient regulatory system still exists mostly on paper. In the latter case, the goal should be to build co-regulation and community input into the regulatory framework as it develops, and to guide investment decisions towards best industry practice from the start.

ISO 14,001 has the potential to contribute to sustainable development, but it also could turn into

merely yet another expensive, bureaucratic exercise for industry that diverts resources from real efforts at improvement. The key issue will be the political commitment of all sides to create and maintain real improvement, and to provide a regulatory and public climate in which business is encouraged to do so.

Notes

(1) . These included acceptance of the idea of cost internalization, and encouragement of capacity-building through technology transfer. L. Zarzsky, "APEC and the Environment: Guiding Principles, Innovative Strategies," Nautilus Institute, March 1996, at 10.

(2) . APEC Ministerial Meeting on Sustainable Development, Declaration and Action Programme, APEC 96/SD-MIN - Rev. 1, 6 Dcl/SD-SOM/10-11 July 1996. The other two major projects to emerge from the Ministerial Meeting focus on sustainable cities/urban management and on the sustainability of the marine environment.

(3) See ISO, **Memento**(1993).

(4) For a fuller description, see, e.g., Perry L. Johnson, **ISO 9000: Meeting the New International Standards** (1993).

(5) . This suspicion was fueled by the prepoderance of European firms among accredited certifiers, and by the insistence of the European Community that only European-accredited certifiers were acceptable.

(6) In 1991, the Business Council for Sustainable Development (BCSD) began creating international standards that would allow businesses in various sectors to measure their environmental impacts according to comparable criteria. See Stephan Schmidheiny, Business Council for Sustainable Development, **Changing Course: A Global Business Perspective on Development and the Environment** 30 (1992). The BCSD's initiative dovetailed with that of a coalition of socially-responsible investors in the United States, who in 1989 published the Valdez Principles, a set of voluntary commitments intended to be used by investors to favor environmentally responsible corporations. The Valdez Principles have now become the CERES Principles. Coalition for Environmentally Responsible Economies, 1990 CERES Guide to the Valdez Principles, reprinted in **John R. Salter, Corporate Environmental Responsibility: Law and Practice** 257 app. (1992). Corporations that signed on to the principles were supposed to: minimize pollutants, resource and energy use and waste generation; inform consumers of the environmental impacts of their products and services, complete and make public an annual self-audit of environmental progress and work toward creation of independent environmental audit procedures to be made available to the public; and establish management and Board structures to oversee environmental performance. Other similar iniatives include the Business Charter for Sustainable Development and the Global Environmental Management Initiative (GEMI). To join, companies simply sign up; public pressure is the only means of monitoring compliance with the commitment. Sectoral codes of conduct, such as the Chemical Manufacturers Association "Responsible Care" program, also appeared.

(7) Council regulation 1836/93. The Regulation became effective as of April 1995.

(8) While the 14,001 EMS is the only auditable standard to which an organization may be "certified," the ISO 14000 series also includes a "guidance document" providing more detailed information on EMS. It also contains environmental auditing standards which set out methodology for audits and qualifications for auditors. It will also include labeling standards which cover goals and criteria for environmental labeling and specific methods and criteria for manufacturer's self-declaration claims (for product attributes like recyclability) and for "seal of approval" programs like Green Seal or Blue Angel. Other related guidelines will deal with life-cycle assessment and with environmental performance indicators.

(9) DIS, Introduction.

(10) DIS, Annex A (Informative) at A.4.0.

(11) In addition, section 4.2.2 requires the organization to "establish and maintain a procedure to identify and have

access to legal and other requirements to which the organization subscribes directly applicable to the environmental aspects of its activities, products, or services." This requirement by itself would seem not to require action to come into compliance with the identified and accessible requirements.

(12) In contrast, several existing business codes of conduct call for global corporations to conform to home country standards wherever they operate. See, e.g. Business Charter on Sustainable Development, principle No. 3; CERES principles, No. 10. Many large global corporations already establish, at least on paper, uniform standards for their operations throughout the world. See UNCTAD, "Developing Country Perspectives on ISO 14,000." (draft, annex E)

(13) . Some delegates have argued that the tie-in to the environmental policy allows for evaluation of improvements in actual performance. They point to the policy requirement (at 4.1(d)) for review of environmental objectives and targets, and to the revised definition of an "environmental management system" (at 3.6) as a system for "developing, implementing, achieving, reviewing and maintaining the environmental policy." This combination, they argue, makes it possible to consider the policy, with its commitment to objectives and targets, an auditable part of an EMS. International Environmental Systems Update, July 1995, at SB-27.

(14) A Dutch proposal to extend the scope of the audit to include evaluation of the extent to which objectives and targets were met was rejected. Int'l Envt'l Systems Update, July 1995, at SB-33.

(15) It now reads: Prevention of Pollution: Use of processes, practices, materials, or products that avoid, reduce or control pollution which may include recycling, treatment, process changes, control mechanisms, efficient use of resources, and materials substitutions. DIS, sec. 3.14.

(16) See U.S. EPA, Policies for Pollution Prevention (1991); Rethinking the Materials we Use: A New Focus for Pollution Policy (Ken Geiser and Frances H. Irwin, eds., 1993).

(17) While an annex does specify that such a procedure generally involves inventories of air emissions, releases to water and land, waste management, and the like (A4.2.1.2), none of these are mandatory; each organization can decide to use them or not, as appropriate. Nor are there at present standardized methods for measuring these parameters.

(18) Bell & Connaughton, supra.

(19) In Canada, for instance, an Alberta court imposed an obligation on Prospec Chemicals, Inc. to obtain ISO 14,001 certification by June 1998 and to deposit a bond to guarantee its compliance, as part of a sentence for exceeding allowable sulfur emissions. Business & The Environment, Vol. VII, No. 3, March 1996, at 2.

(20) The Victoria accredited license scheme involves, in addition to an EMS, a good track record of performance, an environmental improvement plan, an environmental audit system which at some point involves a government auditor, and industry-community liason groups. Industries receive in exchange the ability to operate within broad environmental parameters, with lessened permit, reporting and inspection requirements. Dr. Brian Robinson, "ISO 14000: Eagle or Albatross," paper presented 2 July 1996, Canberra (Australian Centre for Environmental Law). In California, a proposed "Consolidated Permit Zone Pilot Project" would allow ISO 14001 to be used as part of a Facility Compliance Plan which must be approved by state authorities as part of a larger process. Draft Regulations Pursuant to SB 1299, Title 27 Environmental Protection (1996).

(21) UNCTAD study at 72-73.

(22) See U.S. Environmental Protection Agency Office of Pollution Prevention and Toxics, E.P.A. Pollution Prevention Accomplishments 1993 (1994) UPDATE?; "Inspections at Plants to be Suspended in Environmental Leadership Pilot Program," 25 Env't Rep. 2448 (1995).

(23) For a discussion of the far-ranging implications of large-to-small producer links involving product stewardship, audit and training requirements, see Neil Gunningham, "Environment, Self-Regulation, and the Chemical Industry: Assessing Responsible Care," 17 Law & Policy 57, 84 (1995).

(24) In the case of banks and insurers, their leverage depends highly on market conditions. For example, in a market with too many banks and too few borrowers, conditions like ISO 14,001 certification are unlikely. On the other hand, Malaysia and Japan, among others, are considering the imposition of rules regarding disclosure of potential

environmental liabilities like those now required by the U.S. Securities and Exchange Commission. Interview, David Nelson, Sept. 30, 1996.

(25) The GATT 1994 Agreement on Technical Barriers to Trade (TBT) states "[w]here technical regulations are required and relevant international standards exist or their completion is imminent, Members shall use them, or the relevant parts of them, as a basis for their technical regulations...". It thus creates a preference for international standards, and a presumption that international rules are consistent with GATT. Use of the standard, especially in procurement by governments, still raises interesting legal questions. It is unclear whether an EMS standard with no substantive requirements constitutes a "process and production method" and whether, as such, it is encompassed by the TBT. It is also unclear to what extent private use of the standard is subject to WTO disciplines at all. These subjects are beyond the scope of this paper.

(26) The International Accreditation Forum, an association of accreditation bodies, has a working group on the subject. John Hulbert, "Environmental Management Systems, International Trade and Regional Issues," in ISO 14000: Regulation, Trade and Environment, Australian Centre for Environmental Law, 2 July 1996. ISO has a Committee on Conformity Assessment (CASCO) that is also working on guidelines. CASCO Guide 61, "General Requirements for Assessment and Accreditation of Certification/Registration Bodies" "sets out guidelines for a body to follow if it is to be recognized at a national or international level as competent and reliable, in assessing and subsequently accrediting certification bodies." Guide 62, "General requirements for bodies operating assessment and certification/registration of quality systems" "specifies general requirements that a third-party operating quality system certification/registration shall meet, if it is to be recognized as competent and reliable in the operation of quality system certification/registration." IES Update, March 1996, at 15. One problem in translating from the quality control to the environmental arena is that the concerns about disclosure and regulatory compliance that are central to the environmental management context do not apply to quality control.

(27) Charles W. Thurston, "Quality is a Global Affair: Worldwide Adoption of International Organization for Standardization Program, Quality '94, 246 Chemical Marketing Reporter, Oct. 31, 1994, at SR 10. For example, one survey found that ISO 9000 certificates from the Philippines were rejected because of "lack of good reputation and a well known name." Quoted in UNCTAD, "ISO 14001: Five Key Questions for Developing Country Officials, " Geneva 1996, at 80 (Box 5.2).

(28) Internal memo, John Mapes.

(29) . Interview.

(30) Phone interview with Richard Schulberg, Oregon Economic Development Department, Aug. 23, 1996.

(31) APEC, Industrial Science and Technology Transfer, report on activites, September 26, 1996, at http://www.apecsec.org.sg/istwmin2.html.

(32) "Canberra Takes Action on Standards," Australian Financial Review, July 15, 1996, 1996 WL 8974065.

(33) These services are already provided by a number of international organizations, including UNDP, UNEP, UNIDO and others, and APEC's comparative advantage may be simply in making the availability of these services known and in connecting private sector participants from different APEC economies to compare experiences and provide useful models.

(34) Article 12 of EMAS allows national or international standards to be used for this purpose, but the standard must be approved for such use by the European Commission. In 1995, the Commission asked the Committee for European Standardization (CEN) to convene a special working group to produce a "bridge" document specifying the differences between EMAS and ISO 14,001, and the additional steps an organization must take after complying with ISO 14,001 in order to comply with EMAS. That document is currently being finalized, and should shortly be available as a CEN Report. "EC Plans to Bridge Gap Between ISO 14001 and EMAS," ENDS Report 247, Aug. 1995, at 38.

(35) PC 7/WG "EMAS": Final Working Group text of the Bridging Document between Regulation 93/1836/EEC and EN ISO 14001, EN ISO 14010, EN ISO 14011 and EN ISO 14012, draft, 6-14-96/ The ISO 14010 series are approved standards on environmental audits and qualifications of auditors.

(36) "What is PROPER? Reputational Incentives for Pollution Control in Indonesia," PROPER-PROKASIH Team, BAPEDAL and PRDEI, World Bank, Nov. 1995 (draft).

(37) The five categories are: black for total noncompliance, red for insufficient effort toward compliace, blue for bare-bones compliance, green for pollution levels at least 50% lower than discharge standards, and gold for having these minimum pollution levels plus similar levels of control for air and wastes, reaching "high international standards" through use of clean technology and the like.

(38) Like ISO 14,001, too, one of the weaknesses in this approach is the lack to date of public accessibility of the underlying data. To attempt to ensure their credibility with the public in the absence of disclosure, Indonesian regulators have adopted very stringent and conservative criteria for each rating category.

(39) BAPEDAL, "PROPER PROKASIH, Program for Pollution Control Evaluation and Rating," Jakarta, undated mimeo.

(40) Gunningham, supra, at 74-75. As Gunningham points out, the local community panels are limited in that they exercise no monitoring or auditing powers. Id.

(41) See Sanford Lewis, "Precedents for Corporate Community Compacts and Good Neighbor Agreements," Good Neighbor Project, Waverly, MA, 1995. Companies include Unocal Oil in California and Rhone Pulenc in Texas.

(42) For example, in the forestry area, the Forest Stewardship Council is promoting a performance-based, voluntary certification program. See Pierre Hauselmann, "ISO Inside Out: ISO and Environmental Management 11 (WWF, 1996).

(43) Tage V. Andersen, Ministry of the Environment and Energy, Denmark, in a letter to R. van Erman, March 13, 1996.

(44) New Jersey pollution prevention law (need exact cite).

(45) The draft standards are expected by 1998; they will focus on performance both of the management system itself and of the operating system. See Working Draft 14031, ISO/TC 207/SC 4.

(46) See OECD, 1996, "Pollutant Release and Transfer Registers (PRTRs): A Tool for Environmental Policy and Sustainable Development, Guidance Manual for Governments," Organization for Economic Cooperation and Development: Paris. According to WRI researchers, the United Nations Institute for Training and Research has sponsored demonstration projects in the Mexican state of Queretaro and elsewhere testing the feasibility of these approaches, and national environmental authorities in the U.S., Canada and Mexico agreed to harmonization of data in creating a regional pollutant release inventory. Interview with Daryl Ditz, WRI, Sept. 1996.

(47) The system focuses on defining pollution intensity and resource intensity upper and lower bounds for some 1500 product categories ranging from pesticides to food and drink. Although to date the underlying data is almost exclusively U.S.-based, plans are underway to expand the database to include industries from a number of different countries. Once completed, the IPPS will provide one possible global measure of what emissions and resource use correlates with existing best practice on a product-by-product basis, giving companies achievable goals to move towards. David Wheeler et.al., "Industrial Pollution Projection System," available through http:///www.worldbank.org/html/prdei/ipps/ipphome.html.

(48) UNCTAD draft at 102.

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